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ブラシ４９は、圧着部と接触面に形成されて  
ブラシ４７に固定されたカム部５０と、このカ  
ム部５０に垂直に延在する保持されたこれとほぼ同長  
のブラシ本体５１とで形成されており、ブラシ軸  
４７と一体となって回転するように構成されてい  
る。また、ブラシ軸４７の一端には、垂直面とこ  
ろ５２が形成されたカムレバー５３がフレーム４  
３に回転自在に連結されており、ころ５２は、カム  
４８のカム面に対接されている。カムレバー５３  
の中央部の一側を駆動すれば軸４８の他端は、  
フレーム４３に接続されたフランチスタッド５  
５の軸孔に垂直に延在して軸支されており、スタッド  
５５とほぼ軸４８の他端との間には、ころ５２を  
カム４８のカム面へ圧接させる方向の駆動力をカ  
ムレバー５３に付与する圧着コイルばね５６が外  
装されている。そして、ころ５２がカム４８の小  
径部４５に接触したときには、ブラシ本体５１  
の先端が図示した上向きに傾斜し、また  
大径部４６に接触したときには傾斜１の傾から  
傾斜するようになっている。さらに、操作部  
のフレーム４４には、カラー８７と駆動カム５  
８とで軸方向への移動を規制された操作部５  
が、ブラシ軸４７の上方に位置して回転自在に軸支  
されており、その外周部には、駆動作用の操作レ  
バー８８が駆動されている。前記駆動カム５  
８は、操作部５の軸に対して偏心的な凸部のカ  
ム面を有しており、その最大凸部には、凸部  
１が設けられている。８２は、ブラシ軸４７に軸  
支されて遊動部のある８３を駆動カム５８のカ  
ム面に接触させたカムレバーであって、前記遊動部  
コイルばねによりころ５２をカム面に圧接させる  
方向の駆動力を付与されている。そして、操作  
レバー８８でカム５８を移動８１がころ５２と接  
合するまで回転させることにより、駆動カム４  
の凸部に付着するブラシ４９の先端が駆動  
から駆動するようになっている。圧着部２の周  
辺を円形に形成した凸部４に延在する保持であ  
って、周長にわたって延在する延在された駆動  
軸の８５を軸支しており、凸部４の８５の凸部  
は、爪部５との間で傾斜１をねんる爪部５が支  
持されている。また、爪部５は、爪部５により  
爪部５が爪部５に圧接させる方向の駆動力を付与  
されている。

なお、駆動軸防止装置４２は、これとほぼ同  
構成のもの、駆動部２、２１の上方にも設け  
られている。

以上のように構成された実施形態の動作  
を説明する。図示した実施形態は新機台１７上に設  
置された紙１１は、軸４８に１２によつて送紙  
１１上へ１枚ずつ送り出され、スイング１１に運ば  
れてその傾斜により搬送されたものを後述部２  
の爪にねんねられる。この紙１１は後述部２

の、２１、傾斜部２４と駆動部２５とで駆動部  
チェーン２６により駆動部１４へ向つて搬送さ  
れ、圧着部２の傾斜部１４にねんねられて  
搬送される。そして、紙１１は、圧着部２と駆動  
部２、２１との間を通過するときに変位へ差支  
と、印字の印字が施され、紙１１は、紙１１と  
駆動部チェーン２６で駆動部１４へ向  
つて搬送される。搬送された紙１１は、紙１１  
チェーン２６から搬送されて落下し、駆動部２と  
爪部５とで固定部１１に切替られて固定に搬送さ  
れる。そして、紙１１の表面および裏面の不潔箇所  
を抽出部２２、２３が検出して信号を発生する  
と、この信号によつて駆動のタイミングが制御  
部２、２１が制御部２から検出し、不正部には信  
号と印字の印字が行なわれる。また、この信  
号によりさらに搬送されたタイミングで駆動部  
２の表面に検出され、不正部は検出受け  
４１上へ搬送される。

以上のようにして行なわれる印刷作業において  
は、図示したように、圧着部２の傾斜部１４  
が紙１１を駆動して圧着部２と駆動部２との傾斜  
を通過すると、紙１１の表面が検出部１４に検出  
される。紙１１の傾斜によつて２から搬送  
るとともに、圧着部２の傾斜部１４で搬送されて  
ばつたこととする。しかしながら、本装置では  
ブラシ４９の先端が駆動部１の表面に搬送されて  
いてこれを圧着部２の周面に圧着させているので、  
紙１１が押さへつたりばつたりすることがない  
し、そして、ブラシ本体カム４９の先端が圧着コ  
イルばね５の駆動力によつて駆動部１に搬送され、大径  
部４６に接触したときには傾斜部から傾斜するよ  
うになっているので、カム４８の位置固定により  
爪部５が爪部５、２２の傾斜部を通過するはず



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よる汚れや腐蝕の発生を防止することができるので、印刷物の品質が著しく向上し腐蝕の発生量が減少するとともに、ブラシを所定のタイミングで印刷面から離脱させることができるので、ブラシが破など干渉する虞がなくブラシの耐久性が著しく向上する。

■ 簡便な説明

第1図は従来の枕形線形印刷機の型入れ時における紙の移動の説明図、第2図はせい第7図は本考案に係る枕形線形印刷機における印刷部の紙あはれ防止装置の構造列を示し、第3図はこれを実施した枕形線形印刷機の概算構造図、第4図は

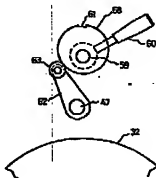
紙あばれ防止装置の展開断面図、第4図は第3図のAA断面図、第5図は第3図のBB断面図、第6図は第3図のC部拡大正面図、第7図は本発明を実施したオフセット・色版組合印刷機の概略断面図である。

10—紙、32—圧制、42—紙おぼれ  
防止快器、48—ブラシ塗料用カム、48エ—  
—大径部、48ロ—小径部、47—ブラシ  
軸、49—ブラシ、51—ブラシ本体、52  
ロ—ころ、53—カムレバー、58—圧迫コ  
イロバネ

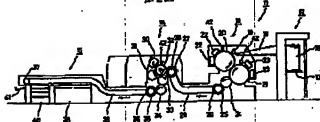
**第1回**



第6回



## 第2回



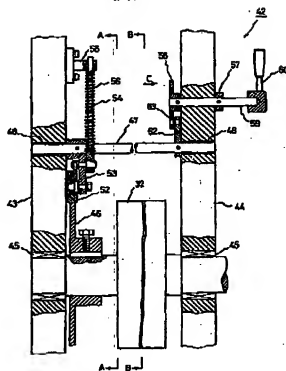
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第3図



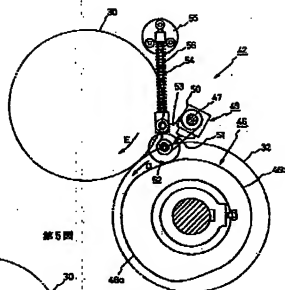
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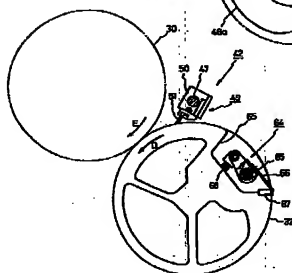
(7)

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第4図



第5図

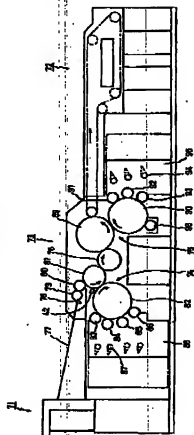


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図7



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TRANSLATION of Japanese Utility Model Publication No. 03-012510

Title of the Invention: Device for Preventing a Sheet of Paper from Falling into Disorder in a Sheet-fed Rotary Printing Press

Publication Date: March 25, 1991

Utility Model Application: No. 57-42239

Filing Date: March 24, 1982

Applicant: Komori Co., Ltd.

#### SCOPE OF CLAIM OF THE UTILITY MODEL

A device for preventing a sheet of paper from falling into disorder in a sheet-fed rotary printing press comprising: a brush shaft pivotally arranged in parallel with a direction of a drum shaft being close to a circumferential face of the drum; a brush fixed to the brush shaft and extended in the direction of the drum shaft while tips of hair are being contacted with a surface of the sheet of paper conveyed on the circumferential face of the drum; a cam lever fixed to an end portion of the brush shaft, a roller being attached to an idle end portion of the shaft; a brush attaching and detaching cam having a cam face formed out of a large diameter portion and a small diameter portion to be contacted with the roller, being fixed to an end portion of the drum shaft; and a spring means for giving torque in a direction, in which the roller is made come into pressure contact with the cam face, to the cam lever.

#### DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a device for preventing a trailing end portion, which is not held, of a

sheet of paper seized by a pawl from falling into disorder in a sheet-fed rotary printing press.

There are many types of sheet-fed rotary printing presses such as an offset printing press, intaglio printing press, a dry offset intaglio printing press, an inspection printing press and so forth. Any of these printing presses includes: a printing device having a group of printing drums and an ink feeding device; a sheet supply device arranged before the printing device; and a sheet discharge device arranged after the printing device. The inspection printing device further includes: an inspection drum; and an inspection mechanism. While a leading end portion of a sheet of paper, which has been sent out by the sheet supply device one by one, is being seized by pawls of the printing drum, the inspection drum and the conveyance chain, the sheet of paper is conveyed.

However, in this sheet-fed rotary printing press, the behavior of a sheet of paper, which is wound round a circumference of the drum after the leading end portion has been seized by the pawl, causes some problems. Fig. 1 is a schematic illustration showing an offset printing press which is taken up as an example. The sheet of paper 3, which has been shifted from the seizure by a pawl of the swing device in the front stage portion or from the seizure by a pawl of the delivery drum to the seizure by the pawl 2 of the pressure drum 1, passes between the pressure drum 1 rotating in the arrow direction and the rubber drum 4 and is wound round a circumferential face of the pressure drum 1. Therefore, an image is transferred from the rubber drum 4 onto a surface of the sheet of paper 3 on the rubber drum 4 side. In this way, printing is executed. However, as

shown in the drawing, under the condition that a leading end of the sheet of paper 3, which is seized by the pawl 2, has passed through a contact point between both drums 1, 4, since a second half portion of the sheet of paper 3 is not held by anything, when both drums 1, 4 are rotated at high speed while the sheet of paper 3 is being given a printing pressure by both drums 1, 4 so that printing can be executed, the sheet of paper 3 is ironed in a direction of the trailing end of the sheet of paper by both drums 1, 3. At the same time, the sheet of paper 3 is waved by a centrifugal force and flapped. Therefore, the sheet of paper passes while it is flapping at a position 30 to 50 mm higher than the circumferential face. Accordingly, a portion of the sheet of paper 3 comes into contact with a circumferential face of the rubber drum 4 and ink adheres onto the sheet of paper 3. Therefore, the sheet of paper 3 is stained with ink and further a portion of the image is transferred. When the adhesion of ink is made onto the sheet of paper 3 as described above under the condition that the sheet of paper 3 is closely contacted with the circumferential face of the rubber drum 4, no problems are caused. However, when the adhesion of ink is made onto the sheet of paper 3 while the sheet of paper 3 is flapping as shown in the drawing, a picture formed by the adhesion ink deviates a little from a picture which will be normally formed being transferred later. Therefore, double printing is made. The above explanations are made in the case of the printing drum. In the case of the inspection drum, a sheet of paper wound round a circumferential face of the drum is inspected by the inspection mechanism. Therefore, when this sheet of paper is flapped as shown in Fig. 1, the

inspection accuracy is remarkably deteriorated, which will become a cause of malfunction.

Since various problems are caused as described above, it is conventional that a brush is provided before the contact portion of both drums and contacted with a sheet of paper which is going to flap, so that the flapping sheet of paper can be suppressed. However, as shown in Fig. 1, a tip portion of the pawl 2 is higher than a surface of the sheet of paper 3. Therefore, the brush is periodically snapped by the pawl 2. Accordingly, the durability of the brush is very low and it is necessary to replace the brush very frequently.

The present invention has been accomplished in view of the above points. A brush extending in an axial direction of a drum, the tips of hair of which are contacted with a surface of a sheet of paper conveyed in a circumferential portion of a drum, is supported by a brush shaft capable of freely rotating. A roller attached to an idle end portion of a cam lever fixed to this brush shaft is made to come into pressure contact with a cam face of a cam provided on a drum axis by a spring member. According to the rotation of the drum, the brush is attached to and detached from a surface of the sheet of paper. Due to the foregoing, only when necessary, the brush is contacted with the surface of the sheet of paper so that the sheet of paper can be prevented from falling into disorder. When unnecessary, the brush is separated from the surface of the sheet of paper so that the brush can not be abraded by the contact with the pawl. The present invention provides a device for preventing a sheet of paper from falling into disorder in a circumferential portion of a drum in a sheet-fed rotary

printing press. Referring to drawings, an embodiment of the present invention will be explained in detail below.

In the present embodiment, the present invention is applied to an inspection rotary printing press. Fig. 2 is a side view showing an outline of a printing press to which the present invention is applied. Fig. 3 is a developed sectional side view of a device for preventing a sheet of paper from falling into disorder. Fig. 4 is a sectional view taken on line A - A in Fig. 3. Fig. 5 is a sectional view taken on line B - B in Fig. 3. Fig. 6 is an enlarged front view taken in a direction of C in Fig. 3. In the drawing, the inspection rotary printing press 11 includes: a sheet supply device 12; an inspection device 13; a printing device 14; and a sheet discharge device 15. The sheet supply device 12 has a sheet loading table 17, on which sheets of paper 16 such as bank notes having a picture printed in the pre-step are loaded, and when a weight of the loaded sheets of paper is reduced, the sheet loading table 17 is automatically raised. In an upper end portion of the inspection device 13, the swing device 19 is arranged which seizes and swings a sheet of paper 16 which has been sent out onto the delivery plate 18 by the sheet supply device 12 one by one. In a lower portion of the inspection device 13, a pair of inspection drums 20, 21 are pivotally arranged in such a manner that the circumferential faces of the inspection drums 20, 21 are opposed to each other. In outer circumferential cutout portions of these inspection drums 20, 21, a plurality of pawls, which are opened and closed by a cam mechanism, are arranged in the axial direction in parallel with each other. After the pawls have seized the sheet of paper 16

conveyed by the swing 19, when the inspection drums 20, 21 are rotated in the arrow direction shown in Fig. 1, while the sheet of paper 16 is being wound round the circumferential faces of the drums 20, 21, the sheet of paper 16 is conveyed. In the neighborhoods of the circumferential faces of the inspection drums 20, 21, the inspection mechanisms 22, 23 are respectively arranged which inspect pictures on both sides of the conveyed sheet of paper 16 and detect a defective sheet of paper and emit a signal of detection. On the same axis as that of the sheet taking drum 25 arranged in an oblique lower portion of the inspection drum 21 through the delivery drum 24, a pair of sprockets 26 are attached. Between these sprockets 26 and a pair of sprockets 28 on the same axis as that of the sheet supply drum 27 of the printing device 14, the conveyance chain 29 traveling in the arrow direction shown in the drawing is provided.

In the printing device 14, the print drums 30, 31, on the circumferential faces of which the numbering machine and the seal print are respectively attached, are provided in the vertical direction. The pressure drum 32 arranged in the central portion is opposed to and contacted with both the print drums 30, 31 and the sheet supply drum 27. Reference marks 33, 34 are delivery drums opposed to and contacted with the pressure drum 32 in order. Between a pair of sprockets 36, which are arranged on the same axis as that of the sheet discharge drum 35 opposed to and contacted with the delivery drum 34, and the sprockets 37 of the sheet discharge device 15, the sheet discharge chain 38 traveling in the arrow direction shown in the drawing is provided.

In the sheet discharge device 15, the sheet loading tables 39, 40, on which the sheets of paper 16 released and dropped from the sheet discharge chain 38 are loaded, are arranged in the longitudinal direction. In a lower portion of the sprocket 37, the discharged sheet reception 41 is provided which receives defective sheet of paper discharged when a discharging direction is changed over by a defective sheet detection signal sent from the inspection mechanisms 22, 23 and also receives other sheets of paper to be drawn out.

In the inspection rotary printing press 11 composed as briefly described above, the devices for preventing a sheet of paper from falling into disorder, the entire devices of which are represented by reference mark 42, are respectively arranged in the inspection device 13 and the printing device 14. The device for preventing a sheet of paper from falling into disorder arranged in the printing device 14 will be explained below. The pressure drum 32 is supported by the right and left frames 43, 44 through the bearings 45. To one shaft end portion, the brush attaching and detaching cam 46, on the circumferential face of which a cam face having the large diameter portion 46a and the small diameter portion 46b is provided, is attached being adjacent to the frame 43. On the other hand, in the neighborhood of a rotation biting portion of the pressure drum 32 and the print drum 30 rotating in the directions of the arrows D and E shown in the drawing, the brush shaft 47 extending in parallel with the drum axis direction is pivotally supported by the right and left frames 43, 44 through the brush 48. On this brush shaft 47, the brush 49 is provided. The brush 49 includes: a holder 50, the

length of which is substantially the same as that of the pressure drum 32, fixed to the brush shaft 47; and a brush body 51 the length of which is substantially the same as that of the holder 50, detachably held by the holder 50. The brush 49 is rotated integrally with the brush shaft 47. To one end of the brush shaft 47, the cam lever 53, to the idle end portion of which the roller 52 is attached, is fixed being adjacent to the frame 43. The roller 52 is opposed to and contacted with a cam face of the cam 46. The other end portion of the spring shaft 54, one end of which is attached to the central portion of the cam lever 53, is slidably supported by a shaft hole of the stud 55 having a flange provided in the frame 43. Between the stud 55 and the step portion of the spring shaft 54, the compression coil spring 56 is provided which gives torque for making the roller 52 come into pressure contact with the cam face of the cam 46 to the cam lever 53. When the roller 52 is opposed to and contacted with the small diameter portion 46b of the cam 46, the tips of hair of the brush body 51 are contacted with a surface of the sheet 16 of paper on the pressure drum 32. When the roller 52 is opposed to and contacted with the large diameter portion 46a of the cam 46, the tips of hair of the brush body 51 are separated from a surface of the sheet 16 of paper on the pressure drum 32. Further, in the frame 44 on the operation side, the operation shaft 59, the movement in the axial direction of which is regulated by the collar 57 and the attaching and detaching cam 58, is pivotally supported being positioned at an upper position of the brush shaft 47. In the outer end portion, the operation lever 60 for operating the rotation is attached. The attaching and

detaching cam 58 has a circular cam face which is eccentric with respect to the axial center of the operation shaft 59. In the maximum radius portion of the attaching and detaching cam 58, the cut groove 61 is provided. Reference numeral 62 is a cam lever attached to the brush shaft 47 and having the roller 63 at an idle end portion in such a manner that the roller 63 can be opposed to a cam face of the attaching and detaching cam 58. The cam lever 62 is given torque in a direction by the compression coil spring 56 so that the roller 63 can be contacted to the cam face with pressure. When the cam 58 is rotated by the operation lever 60 until the cut groove 61 is engaged with the roller 63, the tips of hair of the brush 49 are always separated from the surface of the sheet of paper irrespective of the rotation of the cam 46.

Reference numeral 64 represents a seizing pawl device provided in the cutout portion 65 on the outer circumference of the pressure drum 32. The seizing pawl device 64 has a plurality of pawls 66 arranged in parallel with each other on the pawl shaft 65 extending all over the drum length. On a wall face of the cutout portion 65, the pawl table 67 for seizing the sheet 16 of paper between the pawls 66 is attached. The pawls 66 are given torque by the pawl spring 68 in a direction so that the forward end portions of the pawls can be contacted to the pawl table with pressure.

In this connection, the substantially same devices for preventing a sheet of paper from falling in disorder as the device 42 described above are also provided in upper portions of the inspection drums 20, 21.

Operation of the inspection rotary printing press

composed as described above will be explained below. The sheets of paper 16, on which pictures have been printed, loaded on the sheet loading table 17 are sent out one by one onto the delivery plate 18 by the sheet supply device 12 and seized by the swing 19 and conveyed by a swinging motion of the swing 19. After that, the sheet of paper is seized by a pawl of the inspection drum 20. This sheet 16 of paper passes through the inspection drums 20, 21, the delivery drum 24 and the sheet taking drum 25 and is conveyed toward the printing device 14 by the conveyance chain 29. Then, the sheet of paper is seized by the seizing pawl device 64 of the pressure drum 32 and conveyed. When the sheet 16 of paper passes between the pressure drum 32 and the print drums 30, 31, the number and the seal are printed on a surface of the sheet 16 of paper. Then, the sheet 16 of paper is conveyed toward the sheet discharge device 15 by the sheet discharge chain 38 through the delivery drums 33, 34 and the sheet discharge drum 35. The conveyed sheet 16 of paper is released and dropped from the sheet discharge chain 38 and alternately loaded onto the sheet loading tables 39, 40 being changed over for a predetermined quantity of sheets of paper. When a defective portion on the surface side and a reverse side of the sheet 16 of paper is detected by the detection mechanisms 22, 23 and a detection signal is emitted, the print drums 30, 31 are separated from the pressure drum 32 being based on the signal after a predetermined timing has passed. Therefore, no number and seal are printed on the defective sheet of paper. At the more delayed timing, a pawl release position of the sheet discharge chain 38 is changed over and the defective sheet of paper is discharged

onto the discharge sheet reception 41.

In the printing work executed in this way, as described above, when the seizing pawl device 64 of the pressure drum 32 seizes the sheet 16 of paper and passes through a contact point of the pressure drum 32 and the print drum 30, since the second half portion of the sheet 16 of paper is not held, the sheet 16 of paper is ironed by the printing pressure given by both the drums 30, 32 and further waved and flapped by a rotary centrifugal force given by the pressure drum 32. However, according to the present device, since the tips of hair of the brush 49 come into contact with a surface of the sheet 16 of paper so that the sheet 16 of paper is made to come into pressure contact with a circumferential face of the pressure drum 32. Accordingly, there is no possibility that the sheet 16 of paper is waving and flapping. Since the brush attaching and detaching cam 46 is provided, only when the roller 52 is opposed to the small diameter portion 46b of the cam 46, the tips of hair of the brush 49 are contacted with a surface of the sheet of paper by an elastic force of the compression coil spring 56. When the roller 52 is opposed to the large diameter portion 46a of the cam 46, the tips of hair of the brush 49 are separated from the surface of the sheet of paper. Therefore, when it is set by the phase setting of the cam 46 that the roller 52 starts opposing to the small diameter portion 46b right before the pawl 66 passes through a contact point of both the drums 30, 32, the brush 49 comes into contact with the sheet 16 of paper only when necessary and there is no possibility that the brush 49 and the pawl 49 are contacted with each other. Only when the thickness of a sheet of paper is not more

than 0.1 mm, it is necessary for the brush 49 to push the sheet 49 of paper. When the thickness of a sheet of paper is larger than that, there is no possibility that the sheet of paper is waving and flapping. Accordingly, it is unnecessary to use the brush 49. Therefore, in this case, the operation lever 60 is operated and the attaching and detaching cam 58 is rotated resisting an elastic force of the compression coil spring 56 and the cut groove 61 is opposed to the roller 63. Then, the tips of hair of the brush 49 are separated from a surface of the sheet of paper. Accordingly, the brush attaching and detaching cam 46 is idly rotated while the roller 52 is being separated from it. In this case, since the cam lever 62 is pushed by a pushing force of the compression coil spring 56, an engagement of the roller 63 with the cut groove 61 is maintained, that is, the roller 63 and the cut groove 61 are not disengaged from each other. While printing is being conducted on thick sheets of paper, this state can be maintained.

In this connection, the devices 42 for preventing a sheet of paper from falling into disorder provided in the inspection drums 20, 21 are operated in the same manner and it is possible to prevent the sheet 16 of paper from waving. Accordingly, there is no possibility that the inspection mechanisms 22, 23 are erroneously operated.

An example in which the present invention is applied to an inspection rotary printing press is shown above. However, it is possible to apply the present invention to a compound printing press in which offset printing and intaglio printing are combined with each other as shown in Fig. 7. The present invention can be more effectively

applied to this case. The constitution of this printing press will be explained below. In the printing device 73, which is composed in the substantially same manner as that of the printing press 11 described before and which is provided between the sheet supply device 71 and the sheet discharge device 71, the offset printing press represented by reference mark 74 and the intaglio printing press represented by reference mark 75 are longitudinally arranged through the delivery drum 76. Between the offset printing press 74 and the sheet supply device 71, the delivery plate 77, the swing 78 and the delivery drums 79, 80 are provided. The offset printing press 74 includes: a pressure drum 81 opposed to the delivery drum 80; and a rubber drum 82, the diameter of which is twice as large as that of the pressure drum 81, opposed to the pressure drum 81. The printing drums 83, 84, 85, 86 of four colors attached with the print are opposed to the rubber drum 82. Each printing drum 83, 84, 85, 86 is attached with an ink device having an ink pot 87 and a group of rollers. Each ink device is accommodated in the movable frame 88. On the other hand, the intaglio printing press 75 includes: a pressure drum 89, the diameter of which is twice as large; and an intaglio printing drum 90, the diameter of which is twice as large, opposed to the pressure drum 89. The intaglio printing drum 90 is attached with an intaglio print and opposed to the rollers 91, 92, 93 of three colors. Each roller 91, 92, 93 is attached with an ink device having an ink pot 94 and a group of rollers. Each ink device is accommodated in the movable frame 95. Reference numeral 96 is a wiping roller for wiping out redundant ink. The device 42 for preventing a sheet of

paper from falling into disorder described before is arranged in the neighborhood of the rotary biting portion between the pressure drum 81 and the rubber drum 82 of the offset printing press 74.

In this printing press described above, when a sheet of paper, which is supplied to the printing device 73 being seized by the pawl, passes between the pressure drum 81 and the rubber drum 82, offset printing of four colors is executed. When the sheet of paper passes between the pressure drum 89 and the intaglio printing drum 90 through the delivery drum 76, intaglio printing of three colors is executed on the same face as that of offset printing. Then, the sheet of paper is discharged. This printing press is advantageous as follows. In this printing press, a printing pressure adjustment is respectively singly executed in the offset printing device 74 and the intaglio printing device 75. Therefore, the printing pressure adjustment does not affect others. Further, the number of times of changing the seizure of the sheet of paper can be only two, which is advantageous for maintaining the accuracy of printing estimation. In this printing press, an angle formed by the delivery drum 76, the pressure drum 89 and the intaglio printing drum 90 is substantially 90°. Therefore, a printing pressure given at the time of intaglio printing does not change a distance between the centers of the delivery drum 76 and the pressure drum 89. Accordingly, the seizure of a sheet of paper can be stably changed.

The device 42 for preventing a sheet of paper from falling into disorder is operated in the same manner as that of the embodiment described before. However, in this

printing press in which the rubber drum 82 is arranged at a lower position of the pressure drum 81, since a trailing end of the sheet of paper, which has been released from the hold made by the delivery drum 80 and the pressure drum 81, is going to hang down, it is possible for the tips of hair to suppress the trailing end of the sheet of paper. Therefore the device 42 or preventing a sheet of paper from falling into disorder can be more effectively operated.

In this connection, of course, it is possible to apply the present invention in the same manner not only to the embodiments described above but also to sheet-fed rotary printing presses such as various offset printing presses and intaglio printing press.

As can be clearly seen in the above explanations, according to the present invention, in a device of preventing a sheet of paper from falling into disorder in a circumferential portion of a drum of a sheet-fed rotary printing press of the present invention, a brush extending in an axial direction of a drum, the tips of hair of which are contacted with a surface of a sheet of paper conveyed in a circumferential portion of a drum, is supported by a brush shaft capable of freely rotating. A roller attached to an idle end portion of a cam lever fixed to this brush shaft is made to come into pressure contact with a cam face of a cam on a drum axis by a spring member. According to the rotation of the drum, the brush is attached to and detached from a surface of the sheet of paper. According to the above constitution, it is possible to prevent a second half portion, which is not held while a sheet of paper is being conveyed, of the sheet of paper from waving on a drum surface. Therefore, it is possible to prevent

the stain of an image caused by flapping of the sheet of paper. Further it is possible to prevent the transfer of an image caused by flapping of the sheet of paper. Accordingly, the quality of prints can be remarkably enhanced and a quantity of defective sheets of paper can be reduced. Further, since the brush can be separated from the circumferential surface of the drum at a predetermined timing, there is no possibility that the brush and pawls interfere with each other. Accordingly, the durability of the brush can be remarkably enhanced.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic illustration for explaining the behavior of a sheet of paper at the time of changing the seizure of the sheet of paper in a conventional sheet-fed rotary printing press. Figs. 2 to 7 are views showing an embodiment of the device for preventing a sheet of paper from falling into disorder in the circumferential portion of the drum of the sheet-fed rotary printing press of the present invention, wherein Fig. 2 is a side view briefly showing an inspection rotary printing press in which the embodiment is executed, Fig. 3 is a developed sectional side view of the device for preventing a sheet of paper from falling into disorder, Fig 4 is a sectional view taken on line A - A in Fig. 3, Fig. 5 is a sectional view taken on line B - B in Fig. 3, Fig. 6 is an enlarged front view taken in the direction of C in Fig. 3, and Fig. 7 is a side view briefly showing an offset intaglio compound printing press in which the present invention is executed.

16 . . . Sheet of paper

32 . . . Pressure drum

42 . . . Device for preventing a sheet of paper from

falling into disorder

- 46 . . . Cam for attaching and detaching a brush
- 46a . . . Large diameter portion
- 46b . . . Small diameter portion
- 47 . . . Brush shaft
- 49 . . . Brush
- 51 . . . Brush body
- 52 . . . Roller
- 53 . . . Cam lever
- 56 . . . Compression coil spring

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